WEB SERVER INTEGRATED DIRECTLY INTO AN INSERTER SYSTEM TO PROVIDE STATUS MONITORING AND CONFIGURATION CONTROL

5   The present invention relates to a system for remotely monitoring and controlling mail production inserter equipment.

Background

Systems for mass producing mail pieces are well known in the art. Such systems are typically used by organizations such as banks, insurance companies

10   and utility companies for producing a large volume of specific mailings like billing statements, or promotional offers. The starting point for the document production process is a stream of print data generated by the organization wishing to create the mailing. The print streams are usually produced by older, legacy, computer systems that are not easily adapted to do more than provide raw print data that is

15   output as a result of the legacy computer systems' business logic.

The raw print stream data may be manipulated using known print stream manipulation software, such as the Streamweaver™ product of Pitney Bowes Inc. Print stream manipulation software allows users to change the look and content of documents, without requiring changes to the legacy computer systems.

20   Once print stream manipulation is complete, the print stream may be sent to a high volume printer. Such high volume printing results in large rolls or stacks of

documents, usually connected in a continuous web. The webs of documents are

transported to an inserter machine to be separated into individual pages and

turned into mail pieces. Examples of such inserter systems are the 8 series and 9

series inserter systems available from Pitney Bowes Inc. of Stamford Connecticut.

5   In many respects the typical inserter system resembles a manufacturing

assembly line. Sheets and other raw materials (other sheets, enclosures, and

envelopes) enter the inserter system as inputs. A plurality of different modules or

workstations in the inserter system work cooperatively to process the sheets until

a finished mail piece is produced. The exact configuration of each inserter system

10   depends upon the needs of each particular customer or installation.

Typically, inserter systems prepare mail pieces by gathering collations of

documents on a conveyor. The collations are then transported on the conveyor to

an insertion station where they are automatically stuffed into envelopes. After

being stuffed with the collations, the envelopes are removed from the insertion

15   station for further processing. Such further processing may include automated

closing and sealing the envelope flap, weighing the envelope, applying postage to

the envelope, and finally sorting and stacking the envelopes.

Each collation of documents processed by the inserter system typically

includes a control document having coded control marks printed thereon.

20   Scanners are located throughout the inserter system to sense documents and to

allow control for processing of a particular mail piece. The coded marks may be bar codes, UPC code, or the like.

The inserter system control system is coupled to the inserter system's modular components. The control system stores data files identifying how

5   individual mail pieces should be processed. These data files are typically linked to individual mail pieces by the coded marks included on the control documents. As a collation passes through the inserter system, the coded marks on the control document are scanned and the control system directs the modular components to assemble the mail piece as appropriate. Mail pieces such as billing statements

10   will often include a reply document and/or a return envelope that is pre-addressed for delivery back to the originator of the mail piece. Such reply documents and return envelopes may be used to send back payments, or acceptances of offers, or the like.

Once a finished mail piece has been formed by the inserter system, it may

15   be stacked and provided to a carrier service, such as the U.S. Postal Service, for delivery. Often, in order to receive postal discounts, it is advantageous to sort the outgoing mail in accordance postal regulations. Such output sorting devices are well known. Examples of output sorting devices are available from MailCode, Inc.

With conventional inserter systems it is sometimes desired to remotely

20   monitor the status and configuration of the inserter equipment. In order to accomplish this, the inserter control system stores status information for various

modules in a database. Such database is typically stored on a hard drive on a

controller computer. Periodically this database is uploaded to an external network

server from the controller computer hard drive. This network server includes the

appropriate protocols to allow the database information to be transmitted over a

5   network. For example, an HTTP Internet server may serve a database or

repository populated with information from the inserter controller.

Summary of the Invention

        The present invention fills a long standing need to provide the most current

10   inserter status and configuration information for transmission over a network. The

invention eliminates the need for a database or repository for storing inserter

status information by incorporating a web server directly into the inserter control

equipment. By incorporating the web server directly into the inserter controller,

current status information may be efficiently provided on demand, and in real-time.

15   An inserter using the present invention includes a plurality of modules for

accumulating and assembling sheets into mail pieces. Data is gathered from

throughout the plurality of modules in connection with inserter status and

configuration.

        A controller computer is coupled to the plurality of modules and controls

20   assembly of mail pieces in accordance with predetermined instructions. The

controller computer further monitors the status of the modules along with receiving

sensor signals from the sensors throughout. Software based data processing

objects process the inserter status data. The data processing objects pass

processed status data directly to a network protocol object. Thereby status data is

available for transmittal immediately, and there is no need for storage or a

5   repository for periodic uploading. The inserter controller computer further includes

a network port for directly transmitting the status data processed by the network

protocol object to an external network, such as the World Wide Web, or Internet.

The network port and the network protocol object accept incoming requests from

the external network, and immediately provide the requested information.

10   Further details of the present invention are provided in the accompanying

detailed description, figures and claims.

Summary of the Figures

Figure 1 is a first view of an exemplary inserter and controller computer

15   combination.

Figure 2 is a second view of an exemplary inserter and controller computer

combination.

Detailed Description

20   Fig. 1 provides an exemplary mail production system **10**. The system **10**

includes an inserter apparatus **300**, with accompanying sensors and computer

control. A local computer **310** provides the processing instructions to the inserter

300 and receives status information from the inserter **300**. Status information may

include both operational parameters of the equipment, along with current status of

the machine or machine operation. The parameter and status information is

5   typically associated with a particular mail run that the inserter **300** is preparing.

Such parameter and status information is useful for determining inserter or

operator productivity, and for mail run job planning purposes.

A collation chassis **302** collects documents and inserts together, and the

collations are stuffed into envelopes in an inserter module. The chassis module

10   **302** typically includes feeders that feed individual sheets onto a moving belt below.

Collations of sheets are gathered in accordance with instructions from the

controller computer **310**. In an exemplary embodiment, feeder parameters and

status may be monitored by the controller computer. If a particular feeder were

determined to be jamming more frequently than others, then corrective action may

15   be taken.

Collations are inserted into envelopes at inserter module **303**. Stuffed

envelopes can be metered at a metering module **304**. Such metering activity is in

turn monitored and controlled through meter link **323** by local computer **310**. A

scanner **324** further tracks the progress of documents through the inserter

20   machine by looking for the codes on the documents indicating that the

corresponding mail piece has reached the stage at which the scanner **324** is positioned.

Further inserter processing may be carried out at an edge marking module **305** and a printer **306** for putting delivery information onto the stuffed envelopes.

5   Sensors within modules **301-308** communicate with sensor interface **325** to provide machine status and document status information to the local computer **310**.

A divert bin **307** collects misprocessed mail pieces. Finally, an output stacker **308**, sorts the finished mail pieces by postal codes in order that the sender

10   may receive postal presorting discounts. A camera **326** may capture an image of the completed envelope, and such image is associated with the file for the mail piece in the lifecycle monitoring system.

In Fig. 2, the mail production system **10** is depicted with attention to details of the controller computer **310**. In the preferred embodiment, the controller

15   computer **310** is comprised of a general purpose computer coupled with the inserter **300** to provide instructions and to receive data. Alternatively, controller **310** may be any kind of processor, and may be embedded directly in the inserter **300** structure. Within controller **310**, a mail processing instruction module **210** provides instructions to the inserter **300** (and its respective modules) for creating

20   mail pieces. Typically, instructions for each mail piece in a mail run will be included in a Mail Run Data File (MRDF). The instruction module **210** provides the

appropriate MRDF instructions for the inserter equipment to create the mail pieces.

A component data processing module **220** receives and processes status data gathered from the inserter. Status data processing objects **222-224** each

5   receive data from a respective inserter component. For example, object **222** may receive accumulator status data, object **223** may receive folder status data, and object **224** may receive document feeder status data. It will be understood that the status data processing objects can be for data corresponding to any components of inserter **300**. In a preferred embodiment, the module **220** further includes a

10   data parser object **221** for organizing and retrieving inserter status information from the objects **222 – 224**.

A network protocol object **230** acts as an interface for the data processing module **220** and external data requests. Preferably, the protocol module **220** monitors a network port **240** for incoming connections and accepts them. In an

15   HTTP environment, the protocol object **230** is an HTTP web server object and the port **240** is a TCP/IP port. The HTTP web server object **230** accepts and decodes any requested connections, and provides a connection to the requested information in the data processing module **220**.

The network port **240** is connected to an external network **100**, such as the

20   World Wide Web. Consequently, remote computers on the network **100** may directly receive real-time inserter **300** status and configuration data without need

for intermediary storage. By integrating the forementioned network server components, there is no need to store a status database in controller computer **310** hard drive. Further, there is no need for periodic uploading of database information to a separate external server computer.

5   In a preferred exemplary embodiment, using the status and configuration data, a remote computer may include a graphical display of inserter components. The display could indicate the set up configuration of the components, or include statistical information relating to quantities of mail processed, or rates at which they are operating. Information supplied may include equipment parameters such 10 as maximum or minimum speeds. In addition to parameters, the information may include actual operating conditions and status. For example for a feeder device, a minimum feed time parameter may be displayed. Other displayed status may include an actual feed rate and an actual number of jams for the feeder during the course of the current mail run.

15   Thus, although the invention has been described with respect to a preferred embodiment thereof, it will be understood by those skilled in the art that the foregoing and various other changes, omissions and deviations in the form and detail thereof may be made without departing from the scope of this invention, as further described in the following claims.

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